



**Winston H. Hickox**  
Secretary for  
Environmental

# State Water Resources Control Board

---

**Division of Clean Water Programs**  
1001 I Street, Sacramento, 16<sup>th</sup> Floor, California 95814  
P.O. Box 944212, Sacramento, California 94244-2120  
(916) 341-5700 ♦ FAX (916) 341-5707



**Gray Davis**  
Governor

*Protection The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption.  
For a list of simple ways you can reduce demand and cut your energy costs, see our website at [www.swrcb.ca.gov](http://www.swrcb.ca.gov).*

March 26, 2002

**SENT  
VIA E-MAIL**

Assembly Bill 599 (AB 599) Public Advisory Committee (PAC) Members:

APRIL 9, 2002, AB 599 PAC MEETING

The AB 599 PAC will meet on April 9, 2002, at the DoubleTree Inn, 2001 Point West Way, in Sacramento, California from 9:30 a.m. to 4:00 p.m. (directions, enclosure 1).

Please find enclosed the meeting agenda (enclosure 2) and the documents to support many of the agenda items (enclosure 3). Per our discussions at the February 27, 2002 PAC Meeting, we are providing you with the following information:

1. Meeting Summary from February 27, 2002 PAC Meeting.
2. State Groundwater Monitoring Programs (information on existing budget and staff resources, data, and data gaps).
3. Groundwater monitoring definitions.
4. A general list of questions to be addressed by a comprehensive groundwater monitoring program.
5. Outline, prepared by the USGS, on developing an "ideal" groundwater monitoring plan.
6. Outline for the Comprehensive Groundwater Monitoring Report to the Legislature.

In preparation for the April 9, 2002 meeting, please review the above documents. AB 599 meeting information is also available on the State Water Resources Control Board website at:

<http://www.swrcb.ca.gov/cwphome/ab599>

If you have any questions regarding AB 599 or the PAC meeting, please call me at (916) 341-5689 or Mr. John Borkovich at (916) 341-5779.

Sincerely,

/s/

Angela Schroeter, Chief  
Ground Water Special Studies Unit  
Division of Clean Water Programs

Enclosures

cc: Ms. Celeste Cantú, Executive Director  
Mr. Harry M. Schueller, Chief Deputy Director  
Ms. Barbara L. Evoy, Chief, Division of Clean Water Programs (CWP)  
Mr. James Giannopoulos, Chief, Regulatory Programs Branch, CWP  
Ms. Lisa Babcock, Chief, Land Disposal Section, CWP

**Directions to the DoubleTree Inn  
2001 Point West Way  
Sacramento, CA  
(916) 929-8855**

**AB 599 PAC Meeting  
Tuesday, April 9, 2002  
9:30 a.m. – 4:00 p.m.**

**From: Bay Area: (I-80 EAST)**

1. I-80 East to SACRAMENTO.
2. After crossing the Yolo Bypass, take the CAPITAL CITY FWY towards SACRAMENTO/SOUTH LAKE TAHOE. Stay LEFT.
3. Take the I-80/Hwy 99 SOUTH exit towards RENO/FRESNO.
4. Keep LEFT at the fork in the ramp going towards RENO. Merge onto CAPITAL CITY FWY.
5. Exit ARDEN WAY East.
6. Keep RIGHT at the fork in the ramp and exit onto ARDEN WAY staying in the far right hand lane.
7. Turn RIGHT onto POINT WEST WAY. (The 1<sup>st</sup> right turn after the underpass)
8. The DoubleTree Inn will be on the RIGHT (near FWY). Park and enter Main Lobby. Meeting Room will be posted on the Reader Board in the Main Lobby.

**From Reno: (I-80 WEST)**

1. Take I-80 WEST to SACRAMENTO
2. Follow the Madison Avenue exit and merge onto the CAPITAL CITY FWY towards HWY 99 S/SACRAMENTO.
3. Take the ARDEN WAY exit.
4. Turn LEFT onto ARDEN WAY.
5. Turn RIGHT onto POINT WEST WAY. (The 1<sup>st</sup> right turn after the underpass)
9. The DoubleTree Inn will be on the RIGHT (near FWY). Park and enter Main Lobby. Meeting Room will be posted on the Reader Board in the Main Lobby.

**Nearby Lodging:**

- ☐ DoubleTree Inn, 1-800-222-8733
- ☐ Red Lion Hotel, Sacramento, 1401 Arden Way, 916-922-8041
- ☐ Hilton, Sacramento Arden West, 2200 Harvard, 1-800-445-8667 or 916-922-4700
- ☐ Extended Stay America, 2100 Harvard, 916-921-9942
- ☐ Radisson Hotel, Sacramento, Hwy 160 @ Canterbury Rd (500 Leisure Lane)  
1-800-333-3333 or 916-922-2020

## AB 599 PUBLIC ADVISORY COMMITTEE

Tuesday, April 9, 2002

9:30 AM to 4 PM

**Doubletree Hotel - 2001 Point West Way**

Sacramento, California

### A G E N D A

---

- |     |  |               |
|-----|--|---------------|
| 1.  | <i>Convene Meeting</i>   | 9:30          |
| 2.  | <i>Review Agenda and Approve Feb. 27, 2002 Meeting Summary</i>   | 9:30 – 9:45   |
| 3.  | <i>Groundwater Databases</i>   | 9:45 – 10:30  |
|     | <ul style="list-style-type: none"> <li>• Presentation by Dr. Anne Happel (EcoInteractive)</li> <li>• Discussion</li> </ul> |               |
|     | <i>BREAK</i>   | 10:30 – 10:45 |
| 4.  | <i>Overview of State Groundwater Programs (Existing Resources), Data (Formats), and Data Gaps</i>                          | 10:45 – 11:45 |
|     | <ul style="list-style-type: none"> <li>• Discussion</li> </ul>   |               |
| 5.  | <i>Public Comment</i>  | 11:45 – Noon  |
|     | <i>LUNCH</i>   | Noon – 1:00   |
| 6.  | <i>Groundwater Monitoring Definitions</i>  | 1:00 – 1:15   |
|     | <ul style="list-style-type: none"> <li>• Discussion</li> </ul>   |               |
| 7.  | <i>Questions to Address in a Comprehensive Groundwater Monitoring Program</i>  | 1:15 – 1:30   |
|     | <ul style="list-style-type: none"> <li>• Discussion</li> </ul>   |               |
| 8.  | <i>Comprehensive Groundwater Monitoring Plan</i>   | 1:30 – 2:45   |
|     | <ul style="list-style-type: none"> <li>• Presentation by Dr. Kenneth Belitz (USGS)</li> <li>• Discussion</li> </ul>        |               |
|     | <i>BREAK</i>   | 2:45– 3:00    |
| 9.  | <i>Proposed Outline for the Comprehensive Groundwater Monitoring Report to the Legislature</i>                             | 3:00 – 3:30   |
|     | <ul style="list-style-type: none"> <li>• Discussion</li> </ul>   |               |
| 10. | <i>Establish Next PAC Meeting Agenda</i>   | 3:30 – 3:45   |
| 11. | <i>Public Comment</i>  | 3:45 – 4:00   |
| 12. | <i>Evaluate Meeting and Adjourn</i>  | 4:00          |

**April 9, 2002 Public Advisory Committee Meeting  
Supporting Documents**

Per our discussions at the February 27, 2002 PAC Meeting, we are providing you with the following information:

- Item 1.** Meeting Summary from February 27, 2002 PAC Meeting.
- Item 2.** State Groundwater Monitoring Programs (information on existing budget and staff resources, data, and data gaps).
- Item 3.** Groundwater monitoring definitions.
- Item 4.** A general list of questions to be addressed by a comprehensive groundwater monitoring program.
- Item 5.** Outline, prepared by the USGS, on developing an “ideal” groundwater monitoring plan.
- Item 6.** Outline for the Comprehensive Groundwater Monitoring Report to the Legislature.

In preparation for the April 9, 2002 meeting, please review the above documents. AB 599 meeting information and supporting documents is also available on our website at:

<http://www.swrcb.ca.gov/cwphome/ab599>

## **AB 599 Public Advisory Committee**

Cal/EPA Building  
1001 I Street, Sierra Hearing Room, 2<sup>nd</sup> Floor  
Sacramento, California

### *DRAFT Meeting Summary*

Wednesday, February 27, 2002

#### **Convene Meeting**

Angela Schroeter of the SWRCB opened the meeting at 9:30 a.m.

#### **Welcome**

Pete Silva, Member of the SWRCB, and Theo Cline, staff to Assembly Member Carol Liu, welcomed the Public Advisory Committee (PAC) members to their first meeting and wished them success.

Steve Ekstrom, PAC facilitator, also welcomed members and reviewed the day's agenda.

#### **Introductions**

PAC members, Interagency Task Force (ITF) members, SWRCB staff and members of the public introduced themselves.

#### **Orientation to AB 599 and the Role of the PAC**

Angela Schroeter described the roles of the PAC and the ITF as defined in AB 599. In summary, the ITF, comprised of representatives from SWRCB, DWR, DHS, DPR, CDFA and DTSC, is responsible for submitting a multi-agency report to the Governor and Legislature by March, 2003 that identifies actions necessary to establish a comprehensive groundwater monitoring program. The PAC, comprised of representatives from federal agencies, public water systems, local water agencies, groundwater management entities, environmental organizations, business community and agriculture, is formed to advise the ITF in developing its recommendations.

The PAC will meet 6 times in the next year. ITF meetings will be held the day after PAC meetings.

#### **Current Groundwater Monitoring Activities**

James Giannopolous of the SWRCB presented an overview of current groundwater monitoring activities at the SWRCB. The central question is, "Are Surface Contaminants Reaching Deeper Groundwater (The Groundwater We Drink)?" Included in his presentation was a demonstration of how GeoTracker works and an overview of MCL exceedences in the approximately 1197 public drinking water wells that are abandoned, destroyed or inactive status in California.

Members of the ITF presented overviews of their agency's current groundwater-related activities. These included DHS (Gary Yamamoto), DWR (Carl Hauge), DTSC (Dan Gallagher), DFA (Al Vargas), and DPR (John Troiano).

Following these presentations PAC members made several points:

- It's important to focus on salinity
- Are domestic wells being considered?
- Regarding databases:
  - It's important to link the databases of the various participating agencies. There may be funding sources available to support combining databases.
  - GeoTracker could be the foundation for such a linked database.
  - A presentation on databases to the PAC could be useful – could the ITF assess the feasibility of combining databases and report back to the PAC?
  - Should we look at what other states are doing? (the response was that Lawrence Livermore National Laboratory did a search related to Geotracker and found minimal information).
  - Standards for database formats are important, as is standardized data collection methods.

### **Approaches to a Comprehensive Groundwater Monitoring Plan**

Neil Dubrovsky of the U.S. Geological Survey described different levels of approaches that could be taken to developing a comprehensive groundwater monitoring program. The first and most detailed approach (dense number of monitoring points) is a statewide approach where monitoring points are located using a grid network and all constituents are monitored at all monitoring points. The second approach would be to rely predominantly on existing groundwater data, locate additional monitoring points as necessary in priority areas only, and monitor for all constituents. The third approach (least detailed level) would be to take sub-samples of existing monitoring points (approximately 10-15%), supplement in priority areas, and monitor selected constituents. In all cases the hydrological unit is the basic building block.

PAC members made several points:

- Provide more context; we need to take the time to scope the details before we can advise.
- The ITF should provide the PAC with a few proposals based on different levels of required funding; look at other states for ideas.
- Tell us what agencies currently involved in monitoring are spending and how many people years each has; and what is their original charge or mandate?
- Can we get a vulnerability analysis?
- The PAC should advise on levels of certainty/uncertainty.
- What's the end product? Perhaps we should outline that first (for reference, see page 5 of handout on the orientation to AB 599).
- Define the existing programs and the gaps, and the cost to address those gaps.
- Define terms so we have a common understanding, e.g., what does "assessing" mean?
- What does "all constituents" mean?

- Look at what's currently being monitored well, what's not being monitored well, and what's not being monitored at all.
- The ITF should describe the best possible program, then describe how existing data and activities fit in.
- We should define the level of risk we're willing to accept.
- Identify the common elements of a good assessment program and the tools needed to implement it.
- Most monitoring is regulatory driven; we should shift to one that's resource management driven.

Summary of the discussion:

- At this point, the ITF should not be constrained by costs.
- Identify what the "ideal" comprehensive groundwater monitoring program is and articulate the criteria for it.
- Then, identify the existing gaps.

## **PAC Governance**

The following decisions were reached by consensus:

- Leadership: Bill Mills will serve as the PAC's Chair; David Beckman will be the Vice Chair.
- Agenda development: staff will submit a draft agenda to Bill (Chair), who will in turn forward it to PAC members asking for their input. Bill will forward any changes to the draft agenda to staff.
- Agendas and support materials will be emailed to PAC members two to four weeks prior to each meeting.
- Decision-making process: consensus is the preferred method. However, there may be occasions where simple input to the ITF without consensus will suffice. In some cases, voting may be necessary. A quorum of 7 will be necessary for any voting; and a simple majority of those present will determine if a motion passes.
- There will be no alternate PAC members.
- If a member is going to miss a meeting, s/he may submit their thoughts on a particular agenda item to the Chair in advance.
- Meeting conduct/groundrules:
  - Start on time, end on time.
  - One speaker at a time; allow people to finish; don't interrupt.
  - Be concise.
  - Keep sidebar conversations to a minimum.
  - Stay focused on the topic ... not the person.
  - Be real, but in a respectful way.
  - Listen for understanding; appreciate other points of view; try on other ideas; seek common ground.
  - Seek clarification of other's perspectives ... ask questions

- Public comment: provide two opportunities, before the lunch break and before the meeting is adjourned.

### **Next steps**

- The next meeting will be held April 9<sup>th</sup> in Sacramento. Specific location to be determined.
- Other suggested meeting dates are:
  - April 29, 2002
  - June 19, 2002
  - August 28, 2002
  - October 23, 2002
  - December 18, 2002
  - February 19, 2003

PAC members will be contacted to see if these dates are acceptable.

### **Meeting Evaluation**

Suggested meeting improvements were:

- Improve the sound so microphones aren't needed.
- Transcribe PAC members comments during discussions on flip charts.
- PAC Members should be more focused; it's not necessary to repeat what's already been said or established.
- Create a "parking list" for items that are off-topic but important to address at an appropriate time in the future.

### **Adjournment**

The meeting was adjourned by the Chair at 4:00 p.m.

**TABLE 1: State Agencies Groundwater Monitoring and Assessment Programs**

At the AB 599 Public Advisory Committee (PAC) Meeting on February 27, 2002, the PAC requested information on groundwater monitoring and assessment programs at the ITF agencies. Specifically, PAC requested information on the various program objectives and the amount of resources allocated (amount of staff and annual funding). Table 1 (A through E) specifies information on the state agencies groundwater-related monitoring and assessment programs; and the portion of the total resources allocated specifically for groundwater monitoring and assessment activities - such as review and evaluation of groundwater monitoring data. The information presented in these tables is approximate and will be updated, as new information becomes available. A summary of the information from these tables is shown below:

Agency	Number of PYs Budgeted to Groundwater Monitoring/ Assessment	Budget allocated to Groundwater Monitoring/Assessment (\$/Year)
<b>Table 1A. Dept. of Health Services (DHS)</b>	30 PYs	\$3,000,000/Year
<b>Table 1B. Dept. of Pesticide Regulation (DPR)</b>	9.5 PYs	\$1,295,000/Year
<b>Table 1C. Dept. of Toxic Substances Control (DTSC)</b>	31 PYs	\$3,225,000/Year
<b>Table 1D. Dept. of Water Resources (DWR)</b>	13 PYs	\$1,300,000/Year
<b>Table 1E. State and Regional Water Boards (SWRCB/RWQCBs)</b>	46.7 PYs	\$6,915,000/Year
<b>Table 1F. Dept. of Food and Agriculture (CDFA)</b>	<b>Unknown</b>	<b>Unknown</b>
<b>TOTAL</b>	<b>130.2 PYs</b>	<b>\$15,735,000/Year</b>

**TABLE 1A: Groundwater Monitoring and Assessment Programs (DHS)**

<b>Agency</b>	<b>Groundwater Programs</b>	<b>Groundwater Monitoring/Assessment Objectives</b>	<b>Number of PYs Budgeted to Groundwater Monitoring/Assessment</b>	<b>Budget allocated to Groundwater Monitoring/Assessment (\$/Year)</b>
<b>Dept. of Health Services (DHS)</b>	California Safe Drinking Water Act	<ul style="list-style-type: none"> <li>• Ascertain quality of all PWS sources for compliance with MCLs;</li> <li>• Complete source water assessments of all sources by May 2003;</li> <li>• A source water assessment is required for all new sources before receiving a DHS permit.</li> </ul>	SWAP – 11 (through 5/03); LAB – To be determined; FOB – Estimated to be 16; MEU – 3.0; Based on all sources (groundwater and surface water)	Personnel*: \$3,000,000
	<b>TOTAL (DHS)</b>		<b>30* PYs</b>	<b>\$3,000,000/Year</b>

\* 1 PY estimated at \$100,000

**TABLE 1B: Groundwater Monitoring and Assessment Programs (DPR)**

Agency	Groundwater Programs	Groundwater Monitoring/Assessment Objectives	Number of PYs Budgeted to Groundwater Monitoring/Assessment	Budget allocated to Groundwater Monitoring/Assessment (\$/Year)
<b>Dept. of Pesticide Regulation (DPR)</b>	Ground Water Contaminate Identification	1. Determine potential for movement of pesticide residues to ground water based on their physical/chemical properties. 2. Conduct well sampling to identify new pesticide active ingredients in ground water. 3. Provide monitoring data to determine trends in pesticide concentrations in contaminated basins.	1 SERS, 2 AERS, 2 ERS	Personnel*: \$500,000 Method Development Costs: 3 chemicals at \$15,000 each = \$45,000 Sample Analysis: 400 wells at \$300 = \$120,000  Subtotal: \$665,000
	Vulnerable Area Identification	1. Determine the spatial extent of contamination for residues already detected in ground water. 2. Use monitoring, soil, depth to ground water, climate and other geographic or agronomic factors to identify areas vulnerable to pesticide contamination of ground water.	0.5 SERS, 1 AERS	Personnel*: \$150,000
	Mitigation Measure Development and Implementation	1. Identify and test mitigation measures to prevent movement of residues to ground water. 2. Implement mitigation measures to prevent continued movement of pesticides to ground water.	1 SERS, 1 ERS	Personnel*: \$150,000 One mitigation study: 400 soil and 200 water samples = \$180,000  Subtotal: \$380,000

Continued...

**TABLE 1B: Groundwater Monitoring and Assessment Programs (DPR cont.)**

<b>Agency</b>	<b>Groundwater Programs</b>	<b>Groundwater Monitoring/Assessment Objectives</b>	<b>Number of PYs Budgeted to Groundwater Monitoring/Assessment</b>	<b>Budget allocated to Groundwater Monitoring/Assessment (\$/Year)</b>
<b>Dept. of Pesticide Regulation (continued)</b>	Backflow and Chemigation Education and Training Program	Prevent the backflow of residues into ground water when they are applied through injection into irrigation water.	1 ERS	Personnel*: \$100,000
	<b>TOTAL (DPR)</b>		<b>9.5 PYs</b>	<b>\$1,295,000/Year</b>

\*1 PY estimated at \$100,000.

**TABLE 1C: Groundwater Monitoring and Assessment Programs (DTSC)**

<b>Agency</b>	<b>Groundwater Programs</b>	<b>Groundwater Monitoring/Assessment Objectives</b>	<b>Number of PYs Budgeted to Groundwater Monitoring/Assessment</b>	<b>Budget allocated to Groundwater Monitoring/Assessment (\$/Year)</b>
<b>Dept. of Toxic Substances Control (DTSC)</b>	Hazardous Waste Management Program - Facility Permitting Division	Evaluation of groundwater contamination at RCRA storage, treatment, and disposal facilities	12	Personnel: \$1,200,000*
	Site Mitigation Program - Statewide Cleanup Operations Division	Evaluation of groundwater contamination at superfund, brownfield, and voluntary cleanup sites	11	Personnel: \$1,100,000*
	Site Mitigation Program - Emergency Response and Statewide Operations Division	Evaluation of groundwater contamination at superfund, brownfield, and voluntary cleanup sites (technical support)	2	Personnel: \$200,000*  Stringfellow groundwater monitoring: \$125,000 per year (100 wells sampled twice a year)
	Site Mitigation Program - Office of Military Facilities	Evaluation of groundwater contamination at military sites	6	Personnel: \$600,000*
	<b>TOTAL (DTSC)</b>		<b>31* PYs</b>	<b>\$3,225,000/Year</b>

\* 1 PY estimated at \$100,000

**TABLE 1D: Groundwater Monitoring and Assessment Programs (DWR)**

<b>Agency</b>	<b>Groundwater Programs</b>	<b>Groundwater Monitoring/Assessment Objectives</b>	<b>Number of PYs Budgeted to Groundwater Monitoring/Assessment</b>	<b>Budget allocated to Groundwater Monitoring/Assessment (\$/Year)</b>
<b>Dept. of Water Resources (DWR)</b>	State Water Project Conjunctive use program (OSWPP)	Basin monitoring associated with SWP conjunctive use projects	Not Available	Not Available
	Integrated Storage Investigations Conjunctive Use Program (DPLA), and Grants and Loans	Data collection, monitoring, & evaluation, feasibility studies for GW recharge and storage	10 PYs and consultants	Personnel: \$1,000,000* Contracts to external agencies (limited funding for groundwater monitoring and assessment): Loans and Grants: (local agencies) Water Bond \$18.5 mil; AB303 \$5 mil; ISI Partnerships \$4 mil in 2001; Water Bond \$100 mil, AB303 \$4 mil, Partnerships \$4 mil in 2002
	Water Data Management Systems	Water Data Library: on-line access to hydrologic data	1 PY current; 2 additional PYs planned	Personnel: \$300,000* Funding uncertain; limited
	Subsidence Monitoring	Monitoring along CA Aqueduct; special studies as needed	Not Available	SWP funded for Aqueduct; no direct funding for special studies
	<b>TOTAL (DWR)</b>		<b>13* PYs</b>	<b>\$1,300,000/Year</b>

\* 1 PY estimated at \$100,000

**TABLE 1E: Groundwater Monitoring and Assessment Programs (SWRCB/RWQCBs)**

<b>Agency</b>	<b>Groundwater Programs</b>	<b>Groundwater Monitoring/Assessment Objectives</b>	<b>Number of PYs Budgeted to Groundwater Monitoring/Assessment</b>	<b>Budget allocated to Groundwater Monitoring/Assessment (\$/Year)</b>
<b>State Water Board (SWRCB)</b>	Groundwater Ambient Monitoring and Assessment (GAMA) Program	The primary objective of the GAMA Program is to assess statewide groundwater quality and aquifer susceptibility.	5.5 PYs	Personnel*: \$550,000 Contracts: \$2,245,000
<b>State and Regional Water Boards (SWRCB/RWQCBs)</b>	Underground Storage Tank (UST) Program	The primary objective of the UST Program is to preserve and enhance the quality of California's water resources by regulating USTs and providing cleanup oversight.	12 PYs	Personnel*: \$1,200,000
	Land Disposal Program	The Land Disposal Program imposes statewide requirements for siting, operation, and closure of waste disposal sites through issuance of waste discharge requirements and compliance and enforcement efforts to ensure adequate protection of water quality.	20 PYs	Personnel*: \$2,000,000
	Spills, Leaks, Investigations, and Cleanup (SLIC) Program (reimbursed cleanup program)	Oversees the investigation and remediation of sites associated with unauthorized releases that may impact water quality.	4 PYs	Personnel*: \$400,000

\*1 PY estimated at \$100,000.

**TABLE 1E: Groundwater Monitoring and Assessment Programs (SWRCB/RWQCBs continued...)**

<b>Agency</b>	<b>Groundwater Programs</b>	<b>Groundwater Monitoring/Assessment Objectives</b>	<b>Number of PYs Budgeted to Groundwater Monitoring/Assessment</b>	<b>Budget allocated to Groundwater Monitoring/Assessment (\$/Year)</b>
<b>State and Regional Water Boards (SWRCB/RWQCBs)</b>	Department of Defense Program (DOD)	The SWRCB and RWQCBs partner with the US Dept. of Defense (DoD) through the Defense and State Memorandum of Agreement (DSMOA) to oversee the investigation and remediation of water quality issues at military facilities. The over 200 military facilities require environmental cleanups that range from a few UST cleanups to complex Superfund cleanups.	5 PYs	Personnel*: \$500,000
<b>Regional Water Boards (RWQCBs)</b>	Regional Board specific efforts	A few Regional Water Boards have special projects to address groundwater monitoring outside the core regulatory programs described above.  Region 2 – Groundwater Basin Evaluations, Electronic Reporting of Solvent Plume Maps	Reg. 2 = .2 PYs	Reg. 2 Personnel*: \$20,000
	<b>TOTAL (SWRCB/RWQCBs)</b>		<b>46.7* PYs</b>	<b>\$6,915,000/Year</b>

\* 1 PY estimated at \$100,000

**TABLE 1F: Groundwater Monitoring and Assessment Programs (DFA)**

Agency	Groundwater Programs	Groundwater Monitoring/Assessment Objectives	Number of PYs Budgeted to Groundwater Monitoring/Assessment	Budget allocated to Groundwater Monitoring/Assessment (\$/Year)
<b>Dept. of Food and Agriculture (CDFA)</b>	Not Applicable	<p>The Food and Agriculture Code (Section 33515) provides that the water supply for the milk house and dairy barn to have a bacterial quality that conforms to the requirements of the State Board of Health for public supplies of drinking water. These requirements are that the water supply be free of total coliform (&lt;1.1 MPN), fecal coliform, or E. coli.</p> <p>The Department of Food and Agriculture (CDFA) enforces these provisions through the dairy sanitation inspection program. Water samples are collected from the dairy water distribution system and analyzed for most probable number (MPN) coliform count. Water supply for most dairies is groundwater.</p> <p>The monitoring is also conducted to satisfy Federal Food and Drug Administration regulations, which require that dairy water supply be evaluated every three years. Nine counties, most of which have a high concentration of dairies are approved to conduct their own inspection program. These counties also conduct water monitoring and maintain their own records.</p>	The Milk and Dairy Foods Branch of CDFA has 39 staff dedicated to inspecting dairies and milk processing plants. It is unknown how many are needed just for dairy inspections and just to conduct the water monitoring aspect of the inspection.	Funding for the dairy inspections and water monitoring is covered by an annual assessment to the dairy. The portion which is just for the monitoring is unknown.
	<b>TOTAL (CDFA)</b>		<b>Unknown</b>	<b>Unknown</b>

**TABLE 2. ITF Groundwater Monitoring/Assessment Data**

At the AB 599 Public Advisory Committee (PAC) Meeting on February 27, 2002, the PAC requested information on groundwater monitoring and assessment data collected by the ITF agencies. Specifically, PAC requested information on the data coverage and formats. Table 2 (A through E) specifies information on the state agencies groundwater-related monitoring and assessment data; the type of sampling used to collect the data (Survey – one time effort, Monitoring – ongoing data collection but limited analysis, or Assessment – ongoing data collection and detailed analysis); the data format (hard copy or electronic); and whether or not spatial location (GIS) data is available. The information presented in these tables is based on the current information available and will be updated, in the future, as appropriate.

TABLE 2A: ITF Groundwater Monitoring/Assessment Data (Dept. of Health Services)

TABLE 2B: ITF Groundwater Monitoring/Assessment Data (Dept. of Pesticide Regulation)

TABLE 2C: ITF Groundwater Monitoring/Assessment Data (Dept. of Toxic Substances Control)

TABLE 2D: ITF Groundwater Monitoring/Assessment Data (Dept. of Water Resources)

TABLE 2E: ITF Groundwater Monitoring/Assessment Data (State and Regional Water Boards)

TABLE 2F: ITF Groundwater Monitoring/Assessment Data (Dept. of Food and Agriculture)

**TABLE 2A: ITF Groundwater Monitoring/Assessment Data (DHS)**

<b>Types of Groundwater Data Collected</b>	<b>Spatial Coverage</b> (Statewide/Regional/ Local)	<b>Type of Sampling</b> (Survey – one time effort, Monitoring – ongoing data collection but limited analysis, or Assessment – ongoing data collection and detailed analysis)	<b>Data Format</b> (Hard copy or Electronic; Application - Oracle, Access, Dbase, Excel, etc.)	<u>Spatial Data (GIS)</u> <u>Available?</u>
<b>Dept. of Health Services (DHS)</b>				
Public Water Well Locations and Water Quality.	Statewide	Monitoring, Assessment	Electronic (Access); Hardcopy	Yes
Source Water Assessment Program Data	Statewide	Survey, Assessment	Electronic (Access)	Yes
Well Data	Statewide	Survey, Assessment	Electronic (Access); Hardcopy	Yes
Water System Water Quality Monitoring Plan	Statewide	Monitoring, Assessment	Hardcopy	No
Groundwater Recharge with Recycled Water Monitoring Programs	Local	Survey, Monitoring	Hardcopy	No

**TABLE 2B: ITF Groundwater Monitoring/Assessment Data (DPR)**

<b>Types of Groundwater Data Collected</b>	<b>Spatial Coverage</b> (Statewide/Regional/ Local)	<b>Type of Sampling</b> (Survey – one time effort, Monitoring – ongoing data collection but limited analysis, or Assessment – ongoing data collection and detailed analysis)	<b>Data Format</b> (Hard copy or Electronic; Application - Oracle, Access, Dbase, Excel, etc.)	<u>Spatial Data (GIS) Available?</u>
<b>Dept. of Pesticide Regulation (DPR)</b>				
Well Inventory Database – Mandated by law that other state agencies report their pesticide well monitoring results to DPR. Other federal and local agencies are contacted for submission of data	Statewide	Collects survey and monitoring data	Electronic - Oracle	Yes. All databases are indexed according to the USGS Public Land Survey Coordinate System - Township/Range/Section (TRS). A database was constructed to convert TRS centroids coordinates to Lat/Long coordinates.
Well Sampling Investigations - Well sampling conducted to comply with Pesticide Contamination Prevention Act. Study objectives are to: 1. Identify pesticide active ingredients in ground water; 2. Identify vulnerable areas; 3. Determine relationship of detections with agronomic and geographic variables; 4. Determine trends in concentration to measure effective of regulations.	Local to Statewide	Surveys and monitoring	Electronic - Oracle (captured in the Well Inventory Database)	Yes. Indexed to TRS

Continued...

**TABLE 2B: ITF Groundwater Monitoring/Assessment Data (DPR cont.)**

<b>Types of Groundwater Data Collected</b>	<b>Spatial Coverage</b> (Statewide/Regional/ Local)	<b>Type of Sampling</b> (Survey – one time effort, Monitoring – ongoing data collection but limited analysis, or Assessment – ongoing data collection and detailed analysis)	<b>Data Format</b> (Hard copy or Electronic ; Application - Oracle, Access, Dbase, Excel, etc.)	<u>Spatial Data (GIS)</u> <u>Available?</u>
<b>Dept. of Pesticide Regulation (DPR)</b>				
Pesticide Use Report Database – Beginning in 1990, all agricultural uses of pesticides are reported to DPR by Township, Range, and Section via the County Agricultural Commissioner	Statewide	Assessment - used to identify potential sampling sites	Electronic - Oracle	Yes. Indexed to TRS
California Vulnerability Model (CALVUL) – Identify soil, climatic, depth to ground water and other geographic properties of vulnerable areas.	Statewide	Assessment - used to identify potential sampling sites	Electronic - Oracle or Access	Yes. Indexed to TRS
Pesticide Chemistry Database – Registrants of pesticide active ingredients are required to submit data on the physical and chemical properties of pesticides including water solubility, soil adsorption coefficient (KOC), hydrolysis half-life, aerobic and anaerobic soil metabolism and dissipation of pesticides	Not Applicable	Assessment - used to identify potential ground water contaminants	Electronic - Oracle or Access	Not Applicable

**TABLE 2C: ITF Groundwater Monitoring/Assessment Data (DTSC)**

<b>Types of Groundwater Data Collected</b>	<b>Spatial Coverage (Statewide/Regional/ Local)</b>	<b>Type of Sampling (Survey – one time effort, Monitoring – ongoing data collection but limited analysis, or Assessment – ongoing data collection and detailed analysis)</b>	<b>Data Format (Hard copy or Electronic ; Application - Oracle, Access, Dbase, Excel, etc.)</b>	<b>Spatial Data (GIS) Available?</b>
<b>Dept. of Toxic Substances Control (DTSC)</b>				
Hazardous Waste Management Program - Facility Permitting Division	Statewide (mostly urbanized areas)	Survey and Monitoring	Hard copy only	No. Spatial well information is not available
Site Mitigation Program - Statewide Cleanup Operations Division	Statewide (mostly urbanized areas)	Survey and Monitoring	Hard copy only	No. Spatial well information is not available
Site Mitigation Program - Emergency Response and Statewide Operations Division	Statewide (mostly urbanized areas)	Survey and Monitoring	Hard copy only except for Stringfellow site (data are currently in Access and will be moved to Equis in the near future)	Yes, for Stringfellow site. Otherwise, spatial well information is not available.
Site Mitigation Program - Office of Military Facilities	Statewide (mostly urbanized areas)	Survey and Monitoring	Hard copy only	No. Spatial well information is not available

**TABLE 2D: ITF Groundwater Monitoring/Assessment Data (DWR)**

<b>Types of Groundwater Data Collected</b>	<b>Spatial Coverage (Statewide/Regional/ Local)</b>	<b>Type of Sampling (Survey – one time effort, Monitoring – ongoing data collection but limited analysis, or Assessment – ongoing data collection and detailed analysis)</b>	<b>Data Format (Hard copy or Electronic ; Application - Oracle, Access, Dbase, Excel, etc.)</b>	<b>Spatial Data (GIS) Available?</b>
<b>Dept. of Water Resources (DWR)</b>				
AB 303 Data—The statute requires that any data collected as a result of the grant must be submitted to DWR. No data have been received to date.	Local	Survey, monitoring, assessment	Hardcopy, Electronic: (various applications)	Yes, varies with project
Well Completion Reports, commonly called Well Logs (DWR 188)	Statewide	NA	Electronic: Access	Yes, limited
Watermaster data for Central and West Coast Basins (Southern District)	Local, Regional	Monitoring	Electronic: Excel	No
Prop 13 Groundwater Storage and conjunctive management project specific data	Local, Regional	Survey, Monitoring, Assessment	Hardcopy, Electronic: (various applications)	Yes, varies with project

**TABLE 2E: ITF Groundwater Monitoring/Assessment Data (SWRCB/RWQCBs)**

<b>Types of Groundwater Data Collected</b>	<b>Spatial Coverage (Statewide/Regional/ Local)</b>	<b>Type of Sampling (Survey – one time effort, Monitoring – ongoing data collection but limited analysis, or Assessment – ongoing data collection and detailed analysis)</b>	<b>Data Format (Hard copy or Electronic ; Application - Oracle, Access, Dbase, Excel, etc.)</b>	<b>Spatial Data (GIS) Available?</b>
<b>State and Regional Water Boards (SWRCB/RWQCBs)</b>				
Groundwater Ambient Monitoring and Assessment (GAMA) Program, California Aquifer Susceptibility (CAS) Assessment - Low-level VOCs, groundwater age data	Statewide	Assessment	Oracle	Yes
GAMA Program, Voluntary Domestic Well Assessment Project - Private domestic drinking water well location and water quality data.	Local	Assessment	Access	Yes
Location, release, water quality, and water level data for Leaking UST sites (Geotracker).	Leaking UST sites located statewide.	Monitoring	Hard copy and Electronic: Oracle	Yes
Location, water quality, and water level data for Land Disposal Program sites.	Land Disposal sites located statewide.	Monitoring	Location (hard copy, limited electronic: Excel); Water quality (hard copy, limited electronic: Excel); Water level data (hard copy, limited electronic: Excel).	Yes (Land Disposal site locations)

**TABLE 2E: ITF Groundwater Monitoring/Assessment Data (SWRCB/RWQCBs cont.)**

<b>Types of Groundwater Data Collected</b>	<b>Spatial Coverage (Statewide/Regional/ Local)</b>	<b>Type of Sampling (Survey – one time effort, Monitoring – ongoing data collection but limited analysis, or Assessment – ongoing data collection and detailed analysis)</b>	<b>Data Format (Hard copy or Electronic ; Application - Oracle, Access, Dbase, Excel, etc.)</b>	<b>Spatial Data (GIS) Available?</b>
<b>State and Regional Water Boards (SWRCB/RWQCBs)</b>				
Location, water quality, and water level data for Dept. of Defense (DOD) and Spills Leaks, Investigations, and Cleanup (SLIC) sites.	DOD and SLIC sites located statewide.	Monitoring	Electronic UST data in Geotracker. In general, site location (hard copy, limited electronic: Excel); Water quality (hard copy, limited electronic: Excel); Water level data (hard copy, limited electronic: Excel).	In progress
Hydrogeologic Vulnerability Areas (GIS) delineated based on published hydrogeologic data and information.	Statewide	NA	Electronic: GIS	Yes
Regional Board specific efforts:  Region 2 – Electronic Solvent Plume Reporting Project.  Others – To be determined	Regional	Survey, Monitoring, Assessment	(Region 2, Electronic Solvent Plume Reporting Project - Excel)	Yes (Region 2, Electronic Solvent Plume Reporting Project)

**TABLE 2F: ITF Groundwater Monitoring/Assessment Data (CDFA)**

<b>Types of Groundwater Data Collected</b>	<b>Spatial Coverage (Statewide/Regional/ Local)</b>	<b>Type of Sampling (Survey – one time effort, Monitoring – ongoing data collection but limited analysis, or Assessment – ongoing data collection and detailed analysis)</b>	<b>Data Format (Hard copy or Electronic ; Application - Oracle, Access, Dbase, Excel, etc.)</b>	<b>Spatial Data (GIS) Available?</b>
<b>Dept. of Food and Agriculture (CDFA)</b>				
Samples are collected from the water distribution system to assess the bacterial content (coliform for MPN).	There are 1.6 million milking cows in California housed in 2,157 dairies. Dairies are located throughout the state but the highest concentrations are in the Central Valley (nearly two-thirds), the north coast (Marin and Sonoma counties) and southern California in the Chino Basin. Water supply for most dairies is from groundwater.	Grab samples are collected on an annual basis from the distribution system for compliance monitoring.	Hardcopy converting to Access.	No

**Table 3. State Agencies Groundwater Monitoring and Assessment Information and Data Gaps**

At the AB 599 Public Advisory Committee (PAC) meeting on February 27, 2002, the PAC asked the Interagency Task Force (ITF) members to identify gaps in the various state groundwater monitoring and assessment programs. Specifically, the PAC requested information on activities that the ITF would conduct given sufficient resources. Table 3 specifies these desired activities. In summary, most agencies would expand current groundwater monitoring and assessment efforts to increase the number of monitoring points; and conduct additional sampling for new constituents. In addition, there is also a need to facilitate data sharing among groundwater agencies and to make groundwater data and information easily accessible to the public.

**Table 3. State Agencies Groundwater Monitoring and Assessment Information and Data Gaps**

<b>Agency</b>	<b>Data Gaps: Additional information or data that agency would collect/assess given sufficient resources.</b>
<b>Dept. of Health Services (DHS), Drinking Water Program</b>	DHS would use additional resources to conduct more sampling and monitoring for new and emergent contaminants; Conduct check sampling on assessing laboratory QA/QC; Assess relationships between contaminants.
<b>Dept. of Pesticide Regulation (DPR)</b>	Additional resources to sample and conduct chemical analyses for a greater number of well samples per year. This would allow for an annual increase in the number of new active ingredients sampled and analyzed; identification of new vulnerable areas; and development of trends in pesticide concentration in a greater number of basins. Collection of a greater amount of information on the water sampled - such as the age of water sampled and the concentration of other constituents in the sample such as nitrate concentration. Collection of a greater amount of information on the wells sampled - such as construction and condition. Studies on the pathway for movement of residues to groundwater in soil clusters where the pathways have not yet been identified.

Agency	Data Gaps: Additional information or data that agency would collect/assess given sufficient resources.
<b>Dept. of Toxic Substances Control (DTSC)</b>	Given sufficient resources, DTSC could develop a comprehensive program to make groundwater data as submitted by responsible parties available to the general public and other regulatory agencies in electronic format. Ideally, all groundwater data submitted to DTSC should be in a standardized electronic format. DTSC should have the personnel to evaluate, manage and post the data on the internet.
<b>Dept. of Water Resources (DWR)</b>	DWR is requesting future B118 funding to strengthen the assessment of basins for water supply reliability studies, especially in light of SB 221 & 610. There are also areas where the existing network of water level monitoring could be improved.
<b>State and Regional Water Boards (SWRCB/RWQCBs)</b>	<p>There is a need to facilitate data sharing among groundwater agencies. Additional resources for each groundwater agency could be utilized to ensure the consistent collection and management of high quality groundwater data. Given additional resources, the SWRCB could expand current database efforts and link state agency groundwater data in a data warehouse so that groundwater data could be made easily accessible to all stakeholders, including regulatory agencies and the public. Increased data sharing would allow groundwater agencies to leverage existing data collection efforts, increase collaboration, and avoid duplication. In addition, the SWRCB and RWQCBs would use additional resources to then increase efforts to assess statewide water quality and maximize groundwater protection efforts utilizing a comprehensive evaluation of groundwater data.</p> <p>The SWRCB would also utilize additional resources to expand the existing Groundwater Ambient Monitoring and Assessment Program to assess the susceptibility of groundwater used for drinking water purposes (increase number of monitoring points and add additional constituents to sampling program).</p> <p>The RWQCBs would utilize additional resources to expand efforts for local groundwater basin evaluations.</p>
<b>Dept. of Food and Agriculture (CDFA)</b>	The monitoring program is conducted for compliance evaluation with provisions for bacterial quality of the water supply. The monitoring program achieves that objective and no additional monitoring is required.

## I. BACKGROUND

### Groundwater Quality Monitoring Act of 2001

(insert section on AB 599)

#### *Why monitor groundwater?*

Groundwater is one of California's greatest natural resources. In an average water supply year, about 30 percent of California's urban and agricultural demand is met by groundwater. In drought years, this percentage increases to more than 40 percent. In 1995, an estimated 13 million Californians or nearly 43 percent of the State's population were served by groundwater. The demand on groundwater will increase significantly as California's projected population increases to 47 million by the year 2020.

Protection and restoration of groundwater resources requires an understanding of where you are and determining where you want to be in the future. Monitoring is a key component in determining our progress toward protecting and restoring groundwater resources in California. It is impossible to evaluate the progress toward groundwater resources protection and restoration without a tool to assess the state of the resource. Monitoring is the tool that helps assess the state of the resource and measure the success of the various groundwater programs.

#### *Is all groundwater monitoring the same?*

In general, groundwater monitoring may be defined as a scientifically designed groundwater surveillance system of continuing measurements and observations, including data evaluation procedures. However, groundwater monitoring can take many different forms depending on the purpose.

The U.S. EPA has identified the following types of groundwater monitoring:

- ambient monitoring
- compliance monitoring

Ambient monitoring is focused on assessing the overall quality of groundwater resources, including areas that may be impacted. Compliance monitoring has a more narrow focus on the impacts and the influence of specific activities, may be used to support regulation and enforcement, and tends to be site-specific.

In addition to addressing the needs of a specific groundwater program, the details of each type of groundwater monitoring will differ depending on aquifer type (alluvial, fractured, karst), size of the monitored area, hydrogeologic conditions (e.g. artesian vs. water table), climatic conditions, land use (urban, agricultural), beneficial use (drinking, irrigation, industrial), existing or potential contamination, funds available, etc.

### ***What is ambient monitoring?***

Generally defined, ambient monitoring refers to any activity in which information and data about the status of the physical, chemical, or biological characteristics of the environment is collected to answer specific questions about the status and trends in those characteristics. Ambient groundwater monitoring can point to the status of groundwater resources, trends of improvement or deterioration in groundwater quality and can focus attention on priority areas where groundwater quality protection or restoration efforts are necessary.

Typically, ambient groundwater monitoring is a long term, continuous program and may include a wide range of groundwater quality parameters and constituents that are sampled at various scales (local, regional, basin-wide, statewide) and frequency (one-time survey, every year, every 10 years). A detailed analysis of the data collected is conducted to assess the resource and used to refine future monitoring activities.

### ***What are the uses of ambient groundwater monitoring information?***

Ambient groundwater monitoring provides information that enables stakeholders to:

1. Assess the current status of groundwater quality
2. Track long-term spatial and temporal trends in groundwater quality associated with the natural environment and/or changes in land use
3. Identify impacts to groundwater resources
4. Assign priorities
5. Implement groundwater quality management programs
6. Evaluate the effectiveness of groundwater management programs
7. Modify actions to improve groundwater program effectiveness

### **References**

EPA-440/9-74-002, Model State water Monitoring Program, US EPA, Office of Water and Hazardous Materials Monitoring and Data Support Division

EPA-600/4-76-026, Monitoring Groundwater Quality: Monitoring Methodology, July 1976

Franke, O.L., Intergovernmental Task Force on Monitoring Water Quality, Conceptual Frameworks for Ground-Water-Quality Monitoring, 1997

Nielsen David, M. Ground-water Monitoring, Lewis Publisher, 1991

Plan For Implementing A Comprehensive Program For Monitoring Surface and Groundwater Quality, State Water Resources Control Board, January 2000.

### **Questions to Address in a Comprehensive Groundwater Monitoring Program**

At the February 27, 2002 PAC Meeting, meeting participants discussed what topics should be addressed by a comprehensive groundwater monitoring program. Based on the PAC meeting discussion, ITF members brainstormed various questions that a comprehensive groundwater monitoring program should answer. Please review the following questions and note additional areas or questions that should be addressed.

#### Groundwater Resource Assessment

- Why is our groundwater polluted?
- What kind of activities are affecting groundwater?
- What is the spatial distribution of groundwater quality and impacts (x, y, z, time)?
- Is current groundwater sampling required by DHS and other groundwater agencies protective of the groundwater resource?
- Are we protecting our recharge water / zones?
- What about “natural” recharge/surface water interaction?
- What are the impacts of artificial recharge projects?
- How do we distinguish between natural and man-made contaminants?
- Are our best management practices (BMPs) effective?

#### Public Health Protection

- How do I know if my drinking water is safe?
- How will I know if new well water will be safe to drink?
- How do we assess the synergistic effect of multiple pollutants?

#### Resource Planning

- What constituents should be monitored to understand groundwater quality?
- How can we anticipate emerging contaminants?
- Are there analytical protocols for all constituents of concern, including emerging contaminants?
- What are the standard operating procedures for groundwater monitoring (QA/QC)?
- Do guidelines exist for interpreting the significance of findings?
- Is their sufficient/capability lab capacity to analyze the samples?
- Where should we install groundwater monitoring points?
- How often should we monitor the groundwater (frequency)?
- What contaminants do I need to be concerned about, in my area, when drilling a well?
- Do we have adequate data management and analytical tools to assess the data?

#### Public Access to Information / Public Education

- What information does the public need to know? What gets transmitted to them regarding their basin? What level of specificity?
- How do we educate the public on groundwater quality?
- How do we dispel the notion that all H<sub>2</sub>O supplies are potable?
- How do we share information on groundwater quality with the public?

#### Source Cleanup/Control (Groundwater Remediation)

- What are the groundwater impacts from Class V injection wells?
- Will there be sufficient information to determine the source of groundwater contamination?
- Are residual contaminants being monitored from groundwater clean-up sites?
- Are we defining impacts from non-point source pollution?

#### Infrastructure (Resource Needs)

- How much will a comprehensive groundwater monitoring program cost?
- How do groundwater agencies coordinate and communicate?
- How do groundwater agencies manage and share data?
- How do we incorporate lessons learned into evolving program?

**Perspectives On Developing An “Ideal” Ground-Water Monitoring Network**  
**Kenneth Belitz, Supervisory Research Hydrologist, USGS**

- I. What does an ideal ground-water monitoring network achieve?
  - A. It provides an assessment of water quality of the ground-water resource
  - B. It detects trends in water quality
  - C. It does not over-sample
  - D. It relates water quality to the human and natural factors that affect water quality
  - E. It incorporates existing resources, where appropriate
- II. What are the components of a monitoring network?
  - A. Hydrogeologic conceptualization
  - B. Wells that provide access to the ground-water resource
  - C. Chemical analyses of water obtained from wells
  - D. Spatially-referenced, digital database
  - E. Interpretation
  - F. Consistency in well selection, chemical analyses, data-base, and interpretation
- III. What are the criteria for well-selection?
  - A. Is there adequate spatial (volumetric) coverage to provide resource assessment?
  - B. Is there adequate coverage to detect trends in space and time?
  - C. Is there adequate coverage to relate water quality to the human and natural factors that affect water quality?
  - D. In areas (volumes) with no existing wells, new wells would be needed
  - E. In areas (volumes) with a large number of wells, a subset of wells would be chosen
- IV. What chemical analyses might be appropriate?
  - A. Field parameters: pH, electrical conductivity, dissolved oxygen, alkalinity
  - B. Major ions and total dissolved solids
  - C. Volatile organic compounds
  - D. Pesticides
  - E. Trace elements
  - F. Stable isotopes (tracers of water sources)
  - G. Tritium and helium (tracers and age-dating)
  - H. Emerging contaminants: pathogens, pharmaceuticals, hormones, personal care products, waste-water indicators
- V. How often should wells be sampled?
  - A. Frequency depends on level of risk to be incurred
  - B. Selected wells in the monitoring network should be sampled more frequently than the entire network
- VI. What should the database provide so that the monitoring program is successful?
  - A. Data are spatially-referenced
  - B. Digital data is transferred from appropriate agencies in a timely manner
  - C. Digital databases are consistent between agencies

D. Analytical facilities and software are available for accessing database

VII. What are some key interpretative results to be provided from a monitoring network?

- A. New exceedances of drinking water standards are identified
- B. New occurrences of compounds of concern are identified
- C. When new exceedances and new occurrences are identified, the prior chemical data collected at that well and from relevant other wells are examined for trends and/or causative factors.
- D. Spatial trends in occurrence and concentration are identified and related to the natural and human factors that affect water quality
  - 1. Flow system is defined at the basin-scale to enable interpretation of data
  - 2. Ground-water containing anthropogenic compounds is demarcated

VIII. Where are the available wells, what chemical data is collected at these wells, and how can this data be used?

- A. Monitoring wells associated with contaminated sites help to delineate degradation of the ground-water resource
- B. Monitoring wells installed for resource assessment are available in some locations; data sharing is voluntary
- C. Public supply wells provide state-wide spatial access, are sampled for a broad suite of analytes, and data are transmitted to DHS
- D. Irrigation wells and domestic wells provide state-wide access, may or may not be sampled, and results are not regularly submitted to a state agency.
- E. Local and state agencies (i.e. DPR, DTSC, DWR, SWRCB, and RWQCBs) maintain networks of wells for sampling of water quality; data sharing is voluntary.

IX. What hydrogeologic data is available that could be incorporated into the monitoring network?

- A. State DWR is responsible for basin characterization, including water levels in some areas
- B. Local agencies conduct basin characterization studies in cooperation with USGS; this data would be available
- C. Local agencies conduct basin characterization studies using staff or consultants; the scope of the characterization varies by agency; information sharing is voluntary.

X. Case study: Coastal Santa Ana Basin

- A. Assembling a data base using data from Orange County Water District
- B. Well selection process
- C. Analytical schedule
- D. Selected results

XI. Case study: southern California coastal plain

- A. Assembling a data base using data from DHS, OCWD, and LADWR
- B. Well selection process
- C. Analytical schedule
- D. Selected results

# **REPORT TO THE LEGISLATURE COMPREHENSIVE GROUNDWATER MONITORING PROGRAM**

## **DRAFT OUTLINE**

### **EXECUTIVE SUMMARY**

#### **BACKGROUND**

- Groundwater Quality Monitoring Act Of 2001 (Assembly Bill 599)
- Why Monitor Groundwater?
- Is All Groundwater Monitoring The Same?
- What Are The Purposes Of Groundwater Monitoring (Resource Assessment, Compliance)?
- What Are The Uses Of Groundwater Monitoring Information?

#### **EXISTING GROUNDWATER MONITORING PROGRAMS IN CALIFORNIA**

- State Groundwater Monitoring Programs/Resources/Data

#### **FEATURES OF A COMPREHENSIVE GROUNDWATER MONITORING PROGRAM**

- Clear Objectives
- Cooperative Efforts
- Adaptability
- Scientifically Sound Monitoring Design
- Meaningful Indicators
- Comparable Methods Of Sampling And Analysis
- Data Quality Assurance/Quality Control
- Results Evaluation
- Continual Refinement
- Regular Reporting

#### **INTERAGENCY COORDINATION FOR GROUNDWATER MONITORING PROGRAMS**

#### **DATA MANAGEMENT NEEDS FOR THE COMPREHENSIVE GROUNDWATER MONITORING PROGRAM**

#### **PUBLIC ACCESS TO GROUNDWATER INFORMATION AND DATA**

#### **DESIGNING A COMPREHENSIVE GROUNDWATER MONITORING PROGRAM**

- Comprehensive Groundwater Monitoring Program Goals And Objectives
- Examples of Existing Comprehensive Groundwater Monitoring Programs

- Conceptual Groundwater Monitoring Framework
- Technical Groundwater Monitoring Plan (USGS)
  1. *Alternative Approaches to a Comprehensive Groundwater Monitoring Plan*
    - *Monitoring Network Design*
    - *Constituents Sampled*
    - *Sampling Frequency*
    - *Levels of Uncertainty*
    - *Pilot Study/Proof-in-Concept*
  2. *Collection of Data/Information from Existing State Groundwater Monitoring Programs*
  3. *Data Management*
  4. *Data Analysis*
  5. *Assess and Identify Information/Data Gaps*
  6. *Assessment of Additional Groundwater Monitoring Necessary*
  7. *Estimate of Resources Necessary to Implement Various Comprehensive Groundwater Monitoring Plan Approaches*
  8. *A Prioritized List of Actions to Increase Effectiveness of Monitoring Efforts*

## **RESOURCE NEEDS TO SUPPORT THE COMPREHENSIVE GROUNDWATER MONITORING PROGRAM**

### **RECOMMENDATIONS FOR IMPLEMENTATION OF A COMPREHENSIVE GROUNDWATER MONITORING PROGRAM**

- Comprehensive Groundwater Monitoring Plan Approach Recommendation
- Recommendations For Coordinating Existing Monitoring Programs
- Recommendations For A Database Capable Of Supporting The Comprehensive Groundwater Monitoring Program
- Recommendations For Making Groundwater Information Available To The Public
- Recommendations For An Ongoing Source Of Funds

## **CONCLUSIONS**